Small Announcements

- Correcting the information given in the lecture, an ALU can perform multiplication in one go by using a cascade of adders. This will take longer than other arithmetical operations, since the signal has to propagate through several adders and therefore might lead to a delay of several clock cycles.

**Example:** In the Intel Pentium, integer multiplication requires 4 cycles, but the multiplication unit is pipelined, which means that it is carried out in 4 consecutive steps, after each of which the next multiplication operation can already start, giving ideally a throughput of one operation per cycle. Floating point addition requires 5 cycles and is pipelined giving a throughput of one operation per 2 cycles and floating point division is not pipelined and requires many cycles (not specified).

- **Timing** of the flow of data is slightly more sophisticated than indicated in the lecture. See new slides 301a,b.

- **Multiplexers** can be used for controlling several data lines by a control signal indicating only the binary number of the line to be selected. Therefore with 3 control lines one out of $2^3$ data lines can be selected.

- **Correction of the sample exam,** question 2, (d), (i): Additionally a first in first out replacement policy has to be assumed.

- The following book:
  R. H. Katz: Contemporary logic design. Benjamin/Cummings Publishing Company, 1994 seems to be a good source for those interested in more details of the design of computers on gate level.
  There are of course others as well. The electrical engineers amongst you have probably better suggestions.

- Because of the absence of the A. Setzer, which makes it necessary to send the coursework by post to Sweden, the deadline for course work 2 has to be treated **very strictly.**

- Solutions for the sample exam will be available from Monday 18/xii/2001, 12:00.

- Additional slides about RISC and superscalar architectures will be available from beginning of January.

- Coursework 1 will be corrected till Monday 18/xii, 12:00, and solutions will be available on Tuesday 18/xii, 12:00 from the student office.

- Comments on the coursework (only if there is something important) will be sent by email to addresses of the form 262144@Swansea.ac.uk. (Who is this student?), hopefully till Monday 18/xii/2000. Please don’t ask me via email for results.

- Merry Christmas and a happy new year.

**Anton Setzer**